Nevertheless, some two hundred and fifty years ago, the amount of its landed property has remained practically the same. In fact, there has been some decrease in the land area, due to the sale of some plots to outsiders. The early families, who established the village, got hold of the land and made use of it to the extent demanded by their needs. They were few in number and their needs were very simple.

Consequently, during the first one hundred and fifty years or so, the balance of the land-population relationship was weighted heavily on the land side—a much greater supply than there was demand. This gave the village people (consciously or unconsciously) a strong impetus to increase their numbers. At the same time, it was realized that one more child on the farm was a decided economic asset, and not a liability. The growing child cost less to be brought up than he or she could produce. No taxation, school fees, medical expenses, etc., to speak of, were involved. The people went on multiplying and increasing, and consequently, dividing and subdividing the land without being in the least concerned with the point to which the process was leading them.

The village population went on increasing until about 1890. A balance was then struck—between the capacity of the village land and the number of people. The land could not support any more people, and there was a vague consciousness of a growing problem—what will the rising generation do? Meantime, the village

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soil began to show signs of depletion. It could no longer give the same produce as when it was virgin soil; and the old methods of agriculture were not capable of rehabilitating the soil to the desired extent. This further disturbed the land-population balance and made the problem seem more acute. Emigration seemed to be the only solution.

The following table (I) of births and deaths for a period of 40 years is a fair indication of the rate at

TABLE I. BIRTHS AND DEATHS IN THE VILLAGE OF [illegible], NORTH LEBANON, 1870-1909

Period	Births	Deaths	Excess of births over deaths
1870-1874	138	97	41
1875-1879	94	40	54
1880-1884	72	34	38
1885-1889	88	44	51
1890-1894	110	32	80
1895-1899	128	34	89
1900-1904	184	40	144
1905-1909	170	48	122
Totals	972	298	674

which the village population was growing. The period covered is 1870-1909. The increase due to immigration may be neglected since only a few families came to settle in the village after 1870. It must be admitted that the writer cannot affirm the perfect accuracy of the table. It was calculated from the village church records and verified, as far as their memories permitted, by some of the village elders. The table shows a very high increase of births over deaths for that period—about 3.3 times.[1]

[1] This means an average natural increase of about 17 per 1000 population for the period 1870-1909. Compare this rate with the following rates (1908-12): Australia,

B:Tennessee G,S-S (no date) 1942
MX1 Lebanon MX1

The writer believes that such a high rate of increase is a true representation of the situation. The facts that tend to support this belief are: the strong desire for children, the large number of children per family, and the healthy condition of the people. This was further verified by mapping the village structure over a period of years. Each map showed the number of households in the village for a particular period. Estimating an average of 6 persons per household (based upon census records for 1930-39 and upon family trees and records for

TABLE II. GROWTH OF POPULATION IN BIRDSVILLE, NORTH LEBANON, FOR PERIODS OF 50 YEARS; 1750-1939

Year	Households	Population
1750	18	108
1800	36	216
1850	121	726
1870		1000
1890		1202
1900	234	1404
1939	203	1218

previous periods) the map may be condensed into the following table (III):

It will be observed that the village population has increased steadily and rapidly until the period 1890-1900, when the peak was reached—between 1,200 and 1,400 people. For the past fifty years, the population has remained stagnant or has shown a slight decrease. The village resources could support that number and no more. The surplus was taken care of by emigration.

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10.7; Belgium, 7.8; France, 6.9; Ireland, 6.8; Russia, 14.7; England, 11.9; See Thompson, Warren S., *Population Problems*, McGraw-Hill Book Company, N. Y., 1930. pp. 313-317.

Pf: Tannous S, G-5 (ca. 1947-48)1949 MEI Lebanon MEI

Egypt, Turkey, and Lebanon, it is the agricultural village that is paramount. The Lebanese, it is true, are generally known abroad as a trading people, whose ships have sailed throughout the Mediterranean world since ancient times. But this urban, merchant community has always been backed by the rural community of the Mountain.

In few other countries do we find the village-community type of human settlement so firmly established and so influential in the development of national life as in Lebanon. The village has existed continuously there since ancient times. Despite great upheavals, the farmer of Lebanon has patiently and persistently cultivated the soil, produced his crops, and raised his livestock. He has found in the rugged mountains a refuge from persecution and oppression. He has adapted himself efficiently to the difficult terrain, blasting the rocks and terracing the steep slopes in order to make room for his trees, vines, and grains. Over many centuries of adjustment to his peculiar physical and societal environment, he has succeeded in developing a clearly defined and firmly established way of life. He stands at present as the main pillar of national life in the mountains of Lebanon, the embodiment of a long and rich cultural heritage.

In appraising the significance of the village community in the life of present-day Lebanon, one can readily point out three major contributions. The first of these is biological: the replenishment and revitalization of the population in general, and of the urban population in particular. A study of the development of Lebanon over the past half century reveals clearly that rural areas have been mainly responsible for the building up of the flourishing urban or partly urban centers of Sidon, Beirut, Tripoli, and Zahleh. They have maintained a high birth rate, true to the trend prevailing in all rural areas of the Middle East. Due to a healthful climate and relatively high standards of sanitation, infant mortality has been lower in Lebanon than in the other countries of the Middle East. The result has been a constant stream of vigorous emigrants leaving the villages for urban centers.

Some fifty years ago this population overflow produced such pressure on the limited land and technological resources of

schools are maintained by the Lebanese government under the authority of the Ministry of National Education and by private, denominational and foreign agencies. There are no public secondary schools, and institutions for advanced education are conducted almost exclusively by private or foreign organizations.

There are two universities in Beirut, both of which have made substantial contributions to educational and social leadership throughout the Near and Middle East. The Université Saint-Joseph, which was founded in 1875, is operated by Jesuit priests, and some of its departments are subsidized by the French government. It has faculties of law, theology, engineering, philosophy, oriental letters and medicine, with constituent schools of dentistry, pharmacy, nursing and midwifery. The American University of Beirut was established as the Syrian Protestant College in 1866, and renamed in 1920. It is a nonsectarian, autonomous institution, sponsored by the Near East Colleges Association. The present university incorporates schools of arts and sciences, engineering, medicine, pharmacy and nursing, as well as a new school for agriculture, organized in 1952.

Vital Statistics

No reliable vital statistics are available for Lebanon. The registration of births and deaths is compulsory by law, but reporting is irregular, and the facilities for the compilation and the analysis of statistical data are inadequate. The published statistics are incomplete and of little value in the interpretation of true birth and death rates. No census has been taken since 1932, but, on the basis of the official population estimates, the birth rate was calculated at 31.5 per 1,000 population in 1947 and at 36.1 in 1948. The death rates were given at 5.5 and 6.1 per 1,000 population, respectively, figures which are obviously low.

The infant mortality rates are unknown. The general laxness in reporting births in many rural villages and the tendency to

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[illegible]—incidence, nature, and distribution of nervous diseases and conditions (e.g., by countries, seasons, sex, age, occupations); occurrence of epidemics; evidence of immunity or susceptibility to diseases; dental estimates; etc. See also:

[illegible] as a social problem 14
Theory and treatment of disease 15
Care of infants and children 41
Delinquency and divorce differences 140
Incidence of insanity and epilepsies 150
Public health 160

621 census is late males only. For comparative purposes, all we have is Thomas's
162 statement that in Bahamania, a mostly Greek Orthodox village near Tripoli, women of two generations ago had an average of five children apiece, whereas the women of a Lebanese emigrant community in the southern part of the United States have an average of 3.6 apiece. The members of the community came from Bahamania, Mustafi, and Ghantour (Thomas, 1940a, p. 345).

HEALTH

104 With a few exceptions, the villagers gave the impression of being in excellent
707 health and there was clear evidence that modern medical practices and practitioners were utilized if necessary as a matter of course. Two villagers had been physicians themselves, a matter of some pride. One is now dead, and the other is retired from practice because of advanced age.

621 There is certainly no evidence of physical or mental defects which can clearly
512 be ascribed to inbreeding. Actually, in view of recent studies, we should not expect to find any. It has been suggested, for example, that the genetic composition of a population in which second-cousin marriage is the regular practice is altered comparatively little even after as many as fifteen generations (Kirchhoff & Griffith, 1936, p. 404). Mustafi has been a predominantly endogamous population for thirteen generations at least, and if present conditions are any indication of those of the past, the marriage of second, or closer, cousins is relatively infrequent.

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mainly Christian) these run by foreigners are now finding it difficult to discern the suspicions of the Government. In Lebanon, there are almost as many private as state schools and the foreign schools still work without difficulty. There are higher schools for teachers and for agriculture and engineering in Syria and for agriculture in Lebanon, but it is usual for a student to pass from a secondary school directly to a university. The following table shows the various types of schools and number of students.

Type	Lebanon, 1950		Syria, 1950-1	
	Schools	Students	Schools	Students
State:				
Primary	677	84,000	1,800	400,000
Secondary	40	6,000	70	25,000
Technical	2	600	2	1,000
Teachers	2	600	2	1,000
Agriculture	1	200	—	—
Kindergarten	87	5,000	30	2,000
Private	347	57,000	70	25,000
Foreign	140	21,000	25	8,000
Totals	1,296	174,400	1,000	462,000

... = not available.

(Sources: Statistical Abstract of Syria, 1951-2; Département, 1950; Statistiques, Etat Actuel, 1950)

The American University of Beirut is non-sectarian and has students from all over the Middle East. It encourages the use of Arabic as well as English, and its most renowned faculties are those of medicine and social sciences. The University of St Joseph in Beirut is run by the Society of Jesus. Attached to this university are schools of medicine, law, and theology, subsidized by the French Government and administered by the Society, in which teaching is carried on in the French language. A National University has recently been started by the Lebanese Government. The Syrian National University in Damascus teaches in Arabic and its most important faculties are those of law and medicine. A separate body for the study of the Arabic language is the Arab Academy of Damascus.

Health

Malaria and amoebic dysentery are endemic and, though efforts are being made to drain breeding-grounds, preventive medicine is only in a rudimentary stage. Good hospitals exist in the cities and more are under construction; qualified doctors practise in all the towns, but in the villages there is still a lack

of clinics and in the cities a shortage of qualified staff to undertake massage, radiotherapy, and orthopaedics, and there is special need to combat tuberculosis. Syrians and Lebanese are now addicted to hashish which, however, is grown in the Bekaa and smuggled to Egypt. The Lebanese Government periodically burns many of the plantations, which inflates the price of the surviving crop.

Economic Survey

More than half the population of the two countries is engaged in agriculture which is the most important economic activity. Natural resources hardly exist; there is bitumen in Jebel Bishri in Syria but its production would not be economic; about 10,000 tons a year of asphalt is produced from the neighbourhood of Latakia; and salt is extracted in commercial quantities near Aleppo.

Petroleum

For a number of years, associates of IPC searched for oil in Syria and Lebanon but without finding it in commercial quantities; in consequence, the areas held by these IPC associates have been given up. However, the two Governments are still anxious for further efforts to be made to find oil in commercial quantities. The importance of petroleum to the economy of Syria and Lebanon lies in the situation of the two republics athwart the pipelines from the fields of northern Iraq and Saudi Arabia which have outlets on the Mediterranean.* From Iraq a 12-inch and 16-inch line carry oil across Syria by way of Palmyra and Homs to Tripoli in the Lebanon. Together, these two lines can carry about 8 million tons of oil a year (160,000 barrels daily). A third IPC line from Kirkuk to Homs then bears north of the other two and reaches the sea at Banias, and so does not run through Lebanon at all. This new line is 28-30-30-inches in diameter and can deliver oil at about 18 million tons a year (360,000 barrels daily). From the fields of Saudi Arabia a 30-31 inch American pipeline (Tapline) travels over 1,000 miles on its way to Sidon in Lebanon, passing through Jordan and Syria. At present the line is pumping at a rate of about 15 million tons a year (300,000 barrels daily). It should be noted that these four lines all carry crude oil, some of which is refined on the Mediterranean shore for local requirements but the bulk is shipped as crude to the refineries of Europe and elsewhere.

The line from Kirkuk to Haifa is not operating and the Haifa

* See Appendix IV, p. 370 below.

Government regulations provide for the construction of sanitary facilities for every household in the rural areas, but they are not frequently enforced in many villages. The residents of malarious are often low, particularly in South Lebanon, and pollution of the ground is a common practice. Night soil is frequently utilized as fertilizer, and the consumption of uncooked vegetables contaminated in this manner contributes to a high prevalence of intestinal infections.

Fauna and Flora

Anthropoda. Mosquitoes. To date, 9 species of anopheline mosquitoes have been reported from Lebanon, but only three—*A. superpictus*, *A. sacharovi* (= *A. elutus*) and *A. claviger* (= *A. bifurcatus*)—are of primary concern as vectors of malaria. *A. pulcherrimus*, *A. wesenbi*, *A. algeriensis*, *A. hyrcanus*, *A. multicolor* and *A. maculipennis* have also been identified, but all are rare or localized in distribution.

A. superpictus is widespread and the most difficult to control, since it breeds prolifically in the numerous mountain streams, as well as in pools formed by the overflow from springs, in sand pits and in irrigation canals and seepages, where the water is clear and at least partially exposed to the sun. Larvae are found from April to November, with peaks of prevalence from July to September, in localities below 1,000 feet and even shorter periods at elevations up to 4,000 feet. *A. sacharovi* breeds in swampy areas and along the vegetated margins of ponds, streams and neglected irrigation canals and seepages. It is most abundant around the coastal swamps formed by obstructions at the mouths of the rivers and in the marshlands bordering large underground springs in the Bekaa. Like *A. superpictus*, it breeds from April to November, while its prevalence varies with the degree of flooding during the rainy season. The preponderance of both species is influenced to a large extent by the timing and the volume of the winter and the spring rainfall.

A. stephensi breeds in wells, cisterns and other accumulations of water devoid of vegetation, and is often a prominent vector in or near towns and villages, particularly in the drier sections of South Lebanon and the Bekaa. It is sometimes associated with A. superpictus in shaded and stagnant stretches of the smaller streams. This species breeds throughout the year, but seldom appears in significant numbers before March or April.

Whenever other types of mosquitoes are present, but, with the exception of Culex pipiens, they are of no known medical importance. A. aegypti is responsible for the transmission of dengue fever, which occurs in sporadic outbreaks. Several species of Culex have been recorded, including C. univittatus (= C. pipiens molestus), the probable vector in occasional cases of filariasis and one of the most annoying pest mosquitoes.

Anopheline control measures are undertaken by several agencies, but up to the present there has been no central governmental program covering all parts of the country. The antimalaria service of the Ministry of Public Health started control operations in the Damour plain, south of Beirut, in 1945. The work, which originally combined swamp drainage and antilarval measures, has gradually been extended, with considerable success, to other portions of the littoral and to limited inland areas, especially in the populous districts to the north and the south of the capital. Larvicidal DDT sprays and residual spraying in the towns and the villages with DDT preparations or Gammexane have been used almost exclusively since 1946.

The Near East Foundation, in cooperation with the Ministry and other agencies, carried on an extensive malaria control campaign in the central Bekaa valley from 1941 to 1955, when it closed its headquarters in Lebanon. Anopheline vectors of malaria have been almost eliminated from the Anjar villages and about 300 square miles in the Aamiik swamp region, south of Riyak. The measures employed included drainage, the

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residual spraying of the village houses with insecticides, the treatment of breeding places with larvicides, the screening of permanent bodies of water with Gambusia fish, and the airplane spraying of anopheline mosquito areas with DDT preparations. The villages protected in this manner in 1951 had an aggregate population of about 60,000.

The United Nations Relief and Works Agency for Palestine Refugees conducts DDT residual spraying programs in camps and villages occupied by refugees under its jurisdiction, especially in the highly endemic coastal areas in the south and in the Jordan plain near the Syrian border. In September, 1951, demonstration projects were initiated by the World Health Organization, in conjunction with the Ministry of Public Health. The program will include systematic surveys in partially controlled and uncontrolled endemic areas, as the Hebron plain, the northern and the southern sections of the Sinai, the littoral around Tyre and the more remote villages in the coastal area subject.

Flies. Flies of the family *Muscidae* are abundant in all parts of the country, and undoubtedly play a significant role in the spread of intestinal and eye diseases. Several species of *Musca* occur, among which *M. domestica vicina* and *M. sorbens* are most prominent. The stable fly, *Stomoxys calcitrans*, and the nonbiting variety, *Musca stabulans*, are also plentiful. Species of *Haematobia* are numerous. The myiasis-producing flies, which are serious pests for the livestock and occasionally attack man, include *Chrysomyia albiceps*, *Calliphora erythrocephala* and various species of *Sarcophaga* and *Wohlfahrtia*. The flies most frequently implicated in human myiasis are probably *Lucilia sericata* and *Wohlfahrtia magnifica*.

Several species of sandflies have been identified, including *Phlebotomus papatasii* and *P. sergenti*, vectors of cutaneous leishmaniasis in endemic foci, and *P. chinensis* and *P. major*, suspected of being vectors in

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sporadic cases of hydrocoma. *P. japonicus* also transmits sandfly fever, which is endemic throughout this region.

Lice. The human lice, *Pediculus humanus corporis*, *P. humanus capitis* and *Phthirius pubis*, infest the inhabitants in some of the poorer urban and rural communities. *P. humanus corporis* is the vector in occasional outbreaks of louse-borne typhus and louse-borne relapsing fever.

Fleas. The human flea, *Pulex irritans*, and the rat and the dog fleas, *Ctenocephalides felis felis* and *C. canis*, are common. The rat flea, *Xenopsylla cheopis*, infests the domestic and the wild rodents, and is implicated in the transmission of sporadic cases of murine typhus and plague. *Xenopsylla humilis* is indigenous to Palestine, and probably occurs throughout the coastal area, where it is a potential vector of plague.

Bedbugs. The bedbug, *Cimex lectularius*, is an annoying pest in all sections of the country.

Ticks and Mites. Numerous species of ticks infest the livestock. The dog tick, *Rhipicephalus sanguineus*, is widespread. It has been implicated in the transmission of cases of Rocky Mountain spotted fever. *Ornithodoros tholozani* is found in certain isolated localities, and is probably the vector in a few recognized cases of tick-borne relapsing fever.

The human itch mite, *Sarcoptes scabiei*, is widely distributed. It was exceptionally prevalent during the war years 1941-45. The grain itch mite, *Pediculoides ventricosus*, is plentiful in the grain-producing districts. It produces a troublesome rash when it attacks man.

Scorpions and Spiders. Species of *Buthus* and *Scorpio* are sometimes seen, particularly in the interior, but serious cases of scorpion sting apparently are unusual. The poisonous black spider, *Latrodectus mactans*, is reported from Syria and Israel, and may exist in adjacent portions of Lebanon.

Reptiles. Poisonous snakes are relatively rare, but the vipers, *Vipera lebetina lebe-*

[illegible]

[illegible]

ness, *P. falciformis* and *P. palmivorus*, are encountered in some localities.

Bedouin. The brown rat, *Rattus norvegicus*, is prevalent throughout the coastal area. *R. rattus alexandrinus* is present in small numbers in Beirut and the coast towns, but predominates in the inland villages. *R. rattus rattus* is also present. Mice are abundant under both urban and rural conditions.

Bedouin.* The bandicoot rat, *Nesokia bandicoot* (= *N. indomitor*), is found in a few localized areas—in the vicinity of Sidon, in the Plain of Sarepta and the irrigated district encountered with the springs of Ras el Ain, near Tyre, and in the Litany River, around the Qasmieh bridge in the Bekaa. It is the intermediate host of *Schistosoma haematobium*, and, although the infection apparently is not endemic in the indigenous population, it has recently been observed among Palestinian refugees in the Tyre region.

Plants. Little scientific information is available, but many of the trees, the grasses and the weeds which are known to produce allergic manifestations in susceptible individuals in other countries flourish, in Lebanon.

The stocks of wheat sometimes contain seeds of *Cephalaria syriaca* or *Lolium temulentum*. Occasional cases of poisoning are traceable to the consumption of bread or burghul prepared from wheat flours thus contaminated.

The broad bean, *Vicia faba*, is widely used as a food, but it may cause such symptoms when eaten raw. Serious cases are relatively rare, but fatalities are reported at most annually among young children. In some cases, the chick-pea, *Lathyrus sativus*, a common fodder crop, is responsible for poisoning when it is used as a food.

Food Sanitation

The sanitary inspection of restaurants and premises where food is prepared or sold is the responsibility of the municipal health

*See footnote, page 46.

[illegible]

[illegible] organization in Beirut and of the government authorities in other parts of the country. Shops dispensing foods are required to have a permit, but the enforcement of sanitary regulations is lax in many towns and villages. Although the law provides for the examination of food handlers at 3-month intervals, the routine examinations are often cursory and of little value. The established meats are inspected from time to time, not only by the health officers, but also by agents of the Lebanese meat's department.

Meat animals are inspected, before and after slaughter, by veterinary officers in the municipal abattoirs in Beirut and the principal cities. There is no regular supervision, however, of the meat supplies in the rural areas. A large percentage of the meat used in Lebanon is imported from Syria or Turkey, and is not subject to routine inspection locally.

[illegible] There are two small pasteurization plants in Beirut which process limited amounts of milk, butter and cheese. Although the plants are supervised by the municipal authorities, no control is exercised over the sanitary quality of the raw product. Pasteurized milk is bottled; all other milk is sold in bulk. Milk is commercially bottled before use in each household, but butter and cheese are potential sources of human infection. Brucellosis is endemic among the cattle and the goats. The extent of bovine tuberculosis is not known.

HEALTH SERVICES AND MEDICAL FACILITIES

Recent Developments

[illegible] The public health organization which had evolved before Lebanon became an independent republic in 1943 was reorganized in 1950, and its responsibilities were defined by law. At that time, its name was changed from that of Ministry of Hygiene and Public Assistance to the Ministry of Public Health. The Ministry, which has its headquarters in Beirut, is administered by a Minister of Public Health who is assisted

[illegible]

[illegible] nurses. Since 1951, nurses have also been trained at the Christian Medical Center in Beirut. A School of Midwifery is incorporated in the Jesuits' Dispensary in Middelton, and has a 4-year course for the training of midwives.

Personnel

[illegible] Physicians. Eight hundred and sixteen physicians were reported as practicing in Lebanon in 1949—roughly 1 per 1,000 population. Of this number, 448 were located in Beirut and the remainder in the governorates—120 in North Lebanon, 148 in Mount Lebanon, 51 in South Lebanon and 49 in the Bekaa. In 1951, the staff of the Ministry of Public Health included 30 doctors—6 attached to the headquarters in Beirut, 4 to the quarantine services and 10 in charge of the area units. The municipality of Beirut employs 10 to 15 physicians and the Ministry of National Education, 4.

Dentistry. Reports for 1949 indicate that there were 106 dentists in the country, 69 of whom were settled in Beirut.

Nurses. In 1951, it was estimated that there were from 350 to 400 nurses in Lebanon. In addition, nursing care was given in the hospitals operated by religious orders.

[illegible] Others. The official publications for 1949 listed 210 graduate midwives and 106 midwives with practical training. Over 70 per cent of the graduate midwives were located in the vicinity of Beirut. The same year, there were 103 graduate pharmacists and 41 assistant pharmacists.

[illegible]

[illegible] Prior to 1941, public health activity was largely concentrated in Beirut; consequently, the organization of preventive services and the extension of medical facilities to the provincial districts are still in the developmental stage. At present the reports of research investigations sponsored by the medical departments of the French and the American universities and by other agencies provide the chief sources of information regarding the prevalence of specific

[illegible]

[illegible] Diseases in Lebanon. A section for the compilation and the study of mortality and mortality statistics was established in the Ministry of Public Health in 1953, but the data collected were previous decades are admittedly incomplete. With relatively few exceptions, the notification of communicable diseases was not compulsory. Resistance to quarantine regulations and fear of the social stigma often attached to certain diseases are among the factors contributing to a general laxity in the reporting of even treated notable communicable hospitals and clinics. Although facilities are being expanded continuously, many cases of illness in the rural areas still receive little or no medical attention. Moreover, due to the inadequacy of laboratory services, the differential diagnosis is lacking in many instances. For the most part, the mortality statistics are reliable in the towns, but in the more remote villages the causes of death may be certified by uneducated officials. The deficiencies in reporting and the inaccuracies in diagnosis thus detract from the reliability of the disease statistics available.

Diseases Known as Communicable, Common Diseases Sometimes, or Diseases Rare

Typhoid and Paratyphoid Fevers. Typhoid fevers are among the most important endemic diseases in the country. Typhoid fever is prevalent, with from 700 to 1,000 cases reported annually in the 5 years [illegible]-49. Water-borne outbreaks, caused by the pollution of spring and well supplies, are frequent, especially in the smaller towns and villages. The individual outbreaks vary in severity, but, in general, the fatality rates range from 5 to 10 per cent. One of the largest epidemics in recent years occurred in Zahle in 1944: over 1,000 cases were recorded. Typhoid fever persists throughout the year, usually with peaks of prevalence between May and October and again in December and January. Water-borne outbreaks often coincide with the onset of the heavy rains in the early winter. The

p. 123(A)

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1934-35, infection was detected in 22 per cent of 1,156 sheep and goats examined and in 45 per cent of 201 cattle.[49] The degree of infection varies, as shown by the subsequent investigation in 1941,[50] in which cysts were found in 7 to 12 per cent of 2,000 sheep carcasses examined, in 47 per cent of 324 cattle and in 67 per cent of 34 camels. The presence of a greater preponderance of cysts with viable scolices in the sheep carcasses, coupled with the fact that mutton is used more extensively than beef, suggests that sheep represent the chief reservoir of infection. Infection with the liver flukes, *Dicrocoelium dendriticum* and *Fasciola hepatica*, is frequent among the sheep and other domestic animals, and cases are seen occasionally in man.

Brucellosis. Brucellosis is enzootic among the cows and the goats. Little raw milk is used, but sporadic human cases result from contact with infected animals or from the consumption of contaminated cheese and butter. In an investigation conducted in the bacteriologic laboratory of the American University hospital in 1948,[51] agglutination tests were performed on 1,370 samples of whey from the milk of animals in localities where the existence of the human disease was suspected. A positive agglutination reaction was obtained in 17 per cent of the samples of milk collected from 306 cows in Beirut and in 23 per cent from 162 cows in Mesloghara, a village in the Mount Lebanon area. Similarly, positive reactions were observed in 15 per cent of the milk samples from 130 goats in Beirut, in 26 per cent from 82 goats in Tripoli and in 16 per cent from 190 goats in Lakkouk, in the mountains between Beirut and Tripoli. Four strains of *Brucella abortus* and 6 of *Br. melitensis* were isolated from the milk samples; 2 each from the cows in Beirut and Mesloghara and from the goats in Beirut, Tripoli and Lakkouk. Evidence of persistent human infection was indicated by the results in a series of agglutination tests on blood serums from 640 patients registered in the hospital and the clinics of the

American University in Beirut. About 6 per cent gave a positive reaction with *Br. abortus* and *Br. melitensis*. Sporadic cases of infection with *Br. suis*, as well as with *Br. abortus* and *Br. melitensis*, are diagnosed in the course of routine serologic examinations in the Institute de Bactériologie of the Faculté Française de Médecine.

Other Infections. Food poisoning caused by the consumption of cheese and other foods contaminated with toxic strains of *Staphylococcus* is common.

Diseases Spread Chiefly Through the Respiratory Tract

Tuberculosis. Tuberculosis is prevalent, but the extent of infection is not accurately known. In the 6 years 1943-48, the reported deaths from tuberculosis averaged 234 a year, or roughly 31 per 100,000 population. The validity of such mortality statistics is questionable, however, due to the deficiencies in reporting and the tendency to conceal the presence of infection.

Several tuberculin test surveys have been made on small selected groups of the population, but with considerable variation in results. In 1948, the first representative survey was undertaken in Beirut and the surrounding suburbs by the Ministry of Public Health, in co-operation with the United Nations International Children's Emergency Fund and associated organizations. From October, 1949, to the middle of March, 1950, tuberculin tests were performed on a voluntary basis on about 41,000 individuals of all ages, 29,500 of whom were subsequently inoculated with BCG vaccine. The proportion of persons giving a positive reaction to tuberculin was estimated at 14 to 22 per cent. Among the schoolchildren, who comprised the largest group, the reaction rate averaged 5 per cent at 6 years of age and 17 per cent at 18 years of age. A comparable series, made up of the persons attending a testing center in one of the poorer districts of Beirut, showed 7 per cent positive reactions among children 6 years of age and 26 per cent at 18 years of age.

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Higher rates were found in other groups. Among the nurses in the 2 university hospitals, the rates were 35 per cent at 20 years of age and 50 per cent at 25 years of age. Tests among textile workers showed a progressive increase in the reaction rate, from 32 per cent at 13 years of age to 60 per cent at 27 years of age. In the military personnel tested, the reaction rate reached 72 per cent at 35 years of age.[1] Since the departure of the international teams in 1950, the tuberculin testing and BCG inoculation program has been carried on in conjunction with the special tuberculosis dispensaries.

The facilities for the diagnosis and the treatment of tuberculosis have been augmented within the last few years, but they are still inadequate. Taking advantage of the unusually favorable climatic conditions, several tuberculosis sanatoria have been established in Lebanon, which attract patients from all the surrounding Arab countries. In 1948, 4 sanatoria, with an aggregate capacity of 1,067 beds, were maintained by religious or philanthropic organizations. About 370 beds were subsidized by the Ministry of Public Health—40 at Antoura and the remainder in the larger sanatorium operated by a French mission at Bhamdoun. The entire quota of tuberculosis beds is not available for Lebanese patients, since private cases of other nationalities are accepted at all institutions. Due to the deficiency in diagnostic facilities, the majority of cases now referred to the sanatoria are in advanced stages of the disease. Since 1949, the Ministry has opened special tuberculosis dispensaries, with X-ray facilities, in Beirut and Zahle and, more recently, in Tripoli and Sidon. The Anti-Tuberculosis Campaign Society and the Lebanese Red Cross also carry on programs for the prevention of tuberculosis and support diagnostic and treatment services.

Smallpox. Smallpox is endemic, and sporadic cases are reported almost annually. Vaccination against smallpox is compulsory, but enforcement is often incomplete in the rural frontier districts. A major epi-

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demic occurred in 1942 which, according to the official statistics, involved 482 cases, with a fatality rate of 21 per cent. The incidence and the severity of the disease declined the following year—43 cases were reported in 1943, with a fatality of 16 per cent. Subsequently, the prevalence was sporadic until 1948, when localized outbreaks were again observed. From 142 to 171 cases a year were reported in 1948-49, but in 1950 the incidence dropped to the normal low level. Two cases were recorded in 1950, none in 1951.

Diphtheria. Diphtheria has increased in prevalence within the last few years. The reported incidence averaged 20 cases a year in the period 1942-47, but since 1948 it has approximated 130 to 200 cases. Many local authorities attribute the sudden rise in the number of recognized cases in part to the recent influx of refugees and tourists from other countries. The presence of a high rate of subclinical infection, with a correspondingly high degree of immunity in the indigenous population, is suggested by the large number of children who give a negative reaction to the Shick test at an early age. In a series of tests performed in 1949[20] on 1,077 children, 4 to 16 years of age, attending schools in Beirut and the immediate vicinity, 91 per cent responded with a negative reaction. Starting at 5 years of age, the proportion of positive reactors averaged 9 per cent up to 10 years of age and 7 per cent from 10 through 14 years of age. Nineteen children from 15 to 16 years of age were included in the series; all gave negative reactions. In 1950, a program was started for the immunization against diphtheria of all children under 10 years of age.

Meningitis. Small localized outbreaks of meningococcus meningitis are reported almost every year. The recorded cases are normally few in number, but waves of increased prevalence are noted at irregular intervals. In the 12 years 1939-50, the incidence ranged from 12 to 52 cases a year, except in the 2 years 1944 and 1945, when it reached 203 and 101 cases, respectively.

Other Infections. Pneumonia and influenza are common. A serious epidemic of influenza occurred in 1950, in which over 2,000 known cases were recorded between February and June and over 800 in the month of March. 164

Measles, whooping cough and mumps are endemic and frequently epidemic. Scarlet fever is rare. A high degree of immunity is apparently acquired at an early age by the local inhabitants, since repeated surveys, using the Dick test, have shown that the natural susceptibility to scarlet fever toxins is low in adolescents and adults. In a Dick test[illegible]ly carried out in 1949[illegible] on 838 children from 5 to 14 years of age, in different schools in Beirut, negative reactions were obtained in 72 per cent. The number of children giving a positive reaction to the toxin decreased gradually from 25 per cent at 6 to 7 years of age to 8 per cent at 12 to 14 years of age. 164 761

Poliomyelitis is normally sporadic, and the first widespread outbreak was reported in 952. In the 3 months from June to September, 55 cases and 9 deaths were reported from various parts of the country. Over 78 per cent of the cases were among children under 5 years of age. Rheumatic fever is prominent among the diseases of childhood. 164

Diseases Spread or Contracted Chiefly Through Contact

Venereal Diseases. Venereal diseases are widely distributed, but little information is available regarding their prevalence in the general population. Syphilis and gonorrhea predominate, but all forms of venereal disease are encountered, especially in Beirut, which is a center for traffic from the east and the west.

Diseases of the Eyes. Trachoma is a major public health problem in sections of southern Lebanon, where a large percentage of the people live in small and often remote villages and the standards of living and sanitation are generally low. The extent of infection varies in different localities, but 164 511 369

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in some villages at least 80 per cent of the inhabitants are affected. The disease is encountered less frequently in the north, except in certain congested quarters of Beirut and Tripoli, which house large numbers of workers from the south. In most areas, a higher rate of infection prevails among the Moslem communities than among the Christians. According to the statistics of the Ministry of Public Health, the incidence has decreased appreciably since 1943. A total of 3,843 cases was reported in 1949, in contrast with over 6,000 cases in 1941. The recorded cases, however, represent a small fraction of the actual prevalence. In a study of roughly 180,000 cases from all parts of the country, undertaken by doctors from the American University of Beirut in 1950,[42] the infection rates were estimated at 40 per cent in South Lebanon, 15 per cent in the Bekaa, 10 per cent in North Lebanon and 5 per cent in Mount Lebanon. They averaged 5 per cent in Beirut district, but reached 20 per cent in some of the poorer quarters of the city.

Acute conjunctivitis is widespread from June to December, and particularly between August and October, when the flies are abundant. About two thirds of the cases are usually attributed to infection with *Haemophilus conjunctivitidis* (Koch-Weeks bacillus). A large proportion of the remainder are of pneumococcal origin. Cases of gonococcal conjunctivitis are relatively infrequent.

A special hospital for the treatment of trachoma and other eye diseases has recently been established by the health authorities at Tebnin, an important focus of trachoma in South Lebanon. Measures for the improvement of sanitary conditions are also being carried forward in many villages.

Diseases of the Skin. Mycotic infections, especially favus and ringworm of the scalp or the skin, are common. The majority of cases of dermatophytosis are caused by *Achorion schoenleini*, *Trichophyton violaceum* or *T. gypseum*. Lupus is sometimes seen in the dermatology clinics.

753 Cases of impetigo are numerous, often
571 following lesions produced by the irritating
569 effects of the sun. Scabies and pediculosis
575 are encountered in the crowded sections of the cities and in the poorer rural villages. Both were widely distributed during the war years 1941-46, when the scarcity of soaps and clothing contributed to increased unhygienic conditions. Cases of human syphilis are observed occasionally.

164 Leprosy. Leprosy is endemic, and cases
569 are reported sporadically. Thirty-one cases were known to exist in Lebanon in 1950. Of this number, 7 were located in South Lebanon and 11 in the Hermil area of the northern Bekaa, while 13 were irregularly distributed throughout the rest of the country. With the exception of one 17-year-old boy in Beirut, all the cases were from rural communities. No young children were included, and most of the affected individuals were over 25 years of age. Clinically, about 75 to 80 per cent of the cases were lepromatous in type. There is no hospital for the
164 treatment of leprosy in Lebanon, but pa-
943 tients are sent at government expense to the
944 leprosarium at Douma, near Damascus.

Leprosy in Lebanon. Areas of Greatest Prevalence

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Other Infections. Canine rabies is common, and human cases are observed from time to time. In each of the 4 years 1947-50, from 469 to 421 persons from Lebanon and Syria received prophylactic treatment for the prevention of rabies at the Institut Antirabique of the Faculté Française de Médecine at Beirut. Either the Semple or the Fermi type of vaccine was employed. From 3 to 6 deaths were recorded each year, usually among individuals who had been bitten by wild animals or who had delayed treatment. About 75 per cent of the persons registered within this period were bitten by dogs and 20 per cent by rats; the remainder by cats, wolves, hyenas and other animals.

Anthrax is enzootic among the sheep, and human infections occur occasionally. Sporadic cases of rat-bite fever are recorded.

Leptospirosis is not reported, but the infection is known to be enzootic among the local rats. Using a combination of staining, darkfield illumination and culture technics, *Leptospira icterohaemorrhagiae* was demonstrated in 8 out of 65 specimens of *Rattus norvegicus* trapped in Beirut in 1945.[20] Five rats of the species *R. rattus alexandrinus* were studied at the same time, but none was found to be infected.

Diseases Spread by Arthropods

Malaria. Malaria has long been a disease of major health and economic importance in Lebanon. As a result of anopheline control programs, it has recently dropped from first to second place among the disease problems of the country. Nevertheless, at least one fifth of the inhabitants live in endemic or hyperendemic regions, and are potentially exposed to infection each year. The trend over the last decade has been downward; the official statistics suggest that the peak of prevalence occurred in 1942-44, coincident with the military operations in the area and the influx of persons from other countries. The recorded cases, which represent a small fraction of the total, diminished from over 21,000 in 1943

to about 6,000 in 1948; the deaths from 132 to 26.

Malaria is present in over one third of the territory, while the highest transmission rates are found in the rural villages situated near swamps or watercourses. The intensity of infection varies with the geography and the social and the agricultural development of the district, as well as with the volume of spring rainfall, factors which govern the breeding of the primary vectors, *Anopheles sacharovi*, *A. superpictus* and *A. claviger*. Hyperendemic foci exist chiefly in the Bekaa valley and in portions of the littoral, but active transmission also takes place in scattered localities in the mountains up to elevations of 2,700-3,000 feet. The malaria season extends from May to December, with *Plasmodium vivax* predominating in the spring and the summer, and *P. falciparum* in the late summer and the fall. *P. malariae* is encountered in a relatively small proportion of the cases. *P. ovale* was identified in 1943,[7] but the presence of this species has not been confirmed, and many authorities doubt that it is indigenous.

Malaria control work, involving drainage projects, antilarval measures and the distribution of antimalarial drugs, has been carried on by governmental and other agencies for several years. Since 1946-47, supplementary programs, based upon residual spraying in the towns and the villages with DDT preparations or Gammexane, have been undertaken by the Ministry of Public Health in the littoral and certain highly malarious inland districts. No co-ordinated surveys have been attempted, but a considerable reduction in prevalence is apparent. In accumulated studies made by different observers prior to 1947, covering 173 representative communities in all 4 provinces, the spleen rates in children were estimated at 50 per cent or more in 22 villages. They ranged from 25 to 49 per cent in 61 villages, from 11 to 24 per cent in 85, and from zero to 10 per cent in 7. However, in limited surveys of 31 rural villages subsequently undertaken by the caza (district)

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Distribution of Malaria in Lebanon

doctors of the Ministry in December, 1950, the spleen rate exceeded 5 per cent in only 3 villages, both in the Bikaa. It was less than 10 per cent in 23 villages, and ranged from 11 to 24 per cent in 3 and from 25 to 40 per cent in 3. Splenic indices of 3 to 25 per cent were observed in 11 villages studied in Mount Lebanon, whereas rates of 30 to 80 per cent had been recorded previously. Similarly, the rates in 6 villages in North Lebanon ranged from 6 to 44 per cent in 1950, as against 14 to 68 per cent in the surveys prior to 1947. The spleen rates for 7 villages in South Lebanon varied from 5 to 16 per cent in 1950 and from 32 to 83 per cent prior to 1947. The 1950 rates for 6 villages in the Bekaa ranged from 5 to 31 per cent; the rates recorded before 1947, from 20 to 80 per cent. Reductions of 35 to 49 per cent were noted in Deir el Achair, Anoumik and Saidi, villages with initial indices of 68 to 80 per cent[40]

Beirut and the surrounding suburbs are now relatively free from malaria. Some transmission takes place in the communities along the river, but the spleen rates probably do not reach 10 per cent, even in the most malarious sectors. As of 1951, major

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foci of malaria persisted in the 'Akkar plain, in sections of the northern and the southern Bekaa and in scattered districts in the Lebanon mountains. A malaria survey, to implement and correlate the previous studies, and a demonstration control program were inaugurated in 1951 by the Ministry, in co-operation with the World Health Organization.

Rickettsial Infections. Louse-borne typhus apparently is not endemic, but occasional outbreaks have been recorded, usually during periods of social distress. Infestation with lice is common among the inhabitants in the poorer urban and rural districts, and minor epidemics have followed the introduction of the disease from surrounding areas in the Near East. No cases were reported during the war years 1941-45, and the widespread employment of DDT sprays in the towns and the villages has materially reduced the danger of infection. Murine typhus is indigenous, however. Sporadic cases are observed from all parts of the country, the majority of which occur during the summer months, from July through September. The disease is typically mild, with a comparatively low fatality rate. The actual prevalence is unknown, due to the general confusion in diagnosis and the lack of facilities for laboratory confirmation outside Beirut. The causative agent, *Rickettsia mooseri*, has been isolated from rats captured in Beirut. The rat flea, *Xenopsylla cheopis*, is the vector.

Cases of fièvre boutonneuse are sometimes reported, in which the dog tick, *Rhipicephalus sanguineus*, is the probable vector. Since the diagnosis has been established primarily in hospitals in Beirut, the extent and the distribution of the infection are uncertain.

Plague. Serious outbreaks of plague have been recorded in the past, but only sporadic cases have been reported since the early 1930s. The last case, a bubonic infection, was seen in 1947 in a village on the outskirts of Beirut. Many local authorities believe that the infection exists among the wild

rodents in some rural districts of the interior, but the presence of a sylvatic focus has not been established.

Relapsing Fever. Tick-borne relapsing fever is endemic, and cases confirmed by laboratory examination are encountered from time to time. The tick vector, *Ornithodorus tholozani*, is found in caves and sheltered crevices in certain remote rural areas.

Outbreaks of louse-borne relapsing fever are described intermittently from Syria, less frequently from Lebanon. In connection with the epidemics which spread through the Mediterranean countries in 1942-44, only 173 cases were recorded from Syria and Lebanon combined.

Leishmaniasis. Isolated cases of kala-azar are observed in the hospitals in Beirut almost every year. The infection probably occurs over a wide area, but only one focus, located around Chekka on the road to Tripoli, has been recognized to date. Cutaneous leishmaniasis, or Oriental sore, is endemic in sections of the Littoral and the Bekaa valley. In 1948, an outbreak involving over 200 cases was reported from Hermil, a village in the northern Bekaa. The cases were found mainly among young children. Canine leishmaniasis is known to be present in the Beirut area, and a considerable reservoir of infection undoubtedly exists among the dog population.

Phlebotomus flies are widely distributed throughout this region. *Phlebotomus papatasii* and *P. sergenti* are vectors of cutaneous leishmaniasis, while *P. chinensis* or *P. major* may be implicated in the transmission of the visceral infection.

Other Infections. Sandfly fever is common during the summer months, when the vector, *Phlebotomus papatasii*, is present in large numbers. Seasonal outbreaks of dengue fever are recurrent in the coastal region. An unusually severe outbreak was experienced in the vicinity of Beirut in 1945.

Filariasis was unknown in Lebanon until 1945, when 3 indigenous cases, all with lymph gland involvement, were reported. Later, in 1951, a series of 4 cases was de-

scribed from Djezzineh, on the coast about 164
30 miles north of Beirut. Microfilaria, supposedly of *Wuchereria bancrofti*, were found in the blood of 3 cases, while the fourth showed symptoms of hydrocele. Local authorities believe that the infection was introduced by African troops stationed in the area during World War II. Potential *Culex* vectors are abundant.

Nutritional Diseases

Undernutrition is seen predominantly 146
among the children in the congested urban 369
districts and in the poorer villages, where 611
poverty, ignorance and, sometimes, intestinal parasitism are contributory factors. Nutritional diseases are relatively rare, but subclinical manifestations of avitaminosis are frequent. Rickets is often observed in South Lebanon: cases are attributed to the fact that many children are improperly fed and are confined indoors for long periods while their parents are at work in the fields.

Goiter is endemic in the vicinity of Zahle 146
and Djezzin. Cases of cretinism are occasionally encountered.

Miscellaneous Conditions

Sporadic outbreaks of infectious hepatitis 164
are reported, usually in the late summer or the fall. Children are primarily affected, but all age groups are represented in the various epidemics. Cases of encephalitis lethargica are diagnosed from time to time.

Q fever is enzootic among the livestock, and undoubtedly exists to some degree in the general population. In studies from the bacteriology department of the American University of Beirut,[45] a large proportion of positive reactions were obtained in complement fixation tests on blood serum samples from sheep, goats and cattle received from various countries in the Near East. In the serums collected from animals in Beirut, positive reactions were obtained in 23 per cent of 228 sheep tested, in 34 per cent of 134 goats and in 8 per cent of 97 cattle. The reaction rates with the serums from smaller numbers of animals from Tripoli

and Sidon were roughly comparable. In a series of 1,151 complement fixation tests on miscellaneous human serums sent to the Wassermann laboratory of the University hospital, 7 per cent gave a positive reaction with Q fever antigen.

SUMMARY

Lebanon, formerly one of the French-mandated Levant states, has been an independent republic since 1943. It is a compact territory, with an estimated population in 1948 slightly in excess of 1,229,500 and a density of roughly 300 inhabitants per square mile. Unlike the surrounding Arab countries, the Christian and the Moslem elements of the population are almost equal in collective numerical strength and political importance.

Responsibility for the health of the people resides in the Ministry of Public Health of the Lebanese government, which acts in co-operation with other ministries and numerous philanthropic and religious organizations. The public health and the medical care functions of the Ministry are directed from Beirut. The city is one of the leading medical centers of the Near and Middle East, with two university medical schools and associated hospitals. In 1948, there were 73 hospitals (including sanatoria) in the country, with an aggregate capacity of 5,181 beds, or approximately 4.2 beds per 1,000 population. Eight hospitals were maintained by the Ministry of Public Health, while 56 were conducted under private or philanthropic auspices and 9 by foreign organizations. In addition to the outpatient services of the hospitals, a central polyclinic, 17 rural dispensaries and 4 tuberculosis clinics were operated by the Ministry; a polyclinic by the municipal health department in Beirut; 16 dispensaries by the Lebanese Red Cross; and various units by other organizations.

Water supplies are derived from streams, springs or wells, and are usually abundant in the coastal region but often deficient in the interior. Treated municipal water sup-

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Supplies are available in Beirut, Tripoli and some of the mountain resort towns, but many well and spring sources are unprotected and subject to pollution. Sewerage systems exist in parts of Beirut and Tripoli, but primitive methods of sewage disposal are employed in most towns and villages. The standards of food sanitation vary; the enforcement of sanitary regulations devolves upon the municipal health organization in Beirut and upon the government in other parts of the country.

The most prominent disease problems are malaria, typhoid fever, dysentery and trachoma. Tuberculosis, pneumonia, venereal diseases, rheumatic fever, helminthiasis and skin infections are common. Monkeypox is

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1960 1961 infection is prevalent in localized foci. Vaccination against smallpox is compulsory, but occasional cases and outbreaks are recorded.

1964 Leprosy, rabies, diphtheria, poliomyelitis, brucellosis, murine typhus, leishmaniasis and tick-borne relapsing fever are endemic. Meningococcus meningitis, measles, whooping cough, dengue fever, sandfly fever and infectious hepatitis are endemic and sometimes epidemic. Scarlet fever and fièvre boutonneuse are sporadic. Filariasis and schistosomiasis have apparently been introduced within the last few years. Outbreaks of plague, louse-borne typhus and cholera have occurred in the past, but no recent cases have been recorded.

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